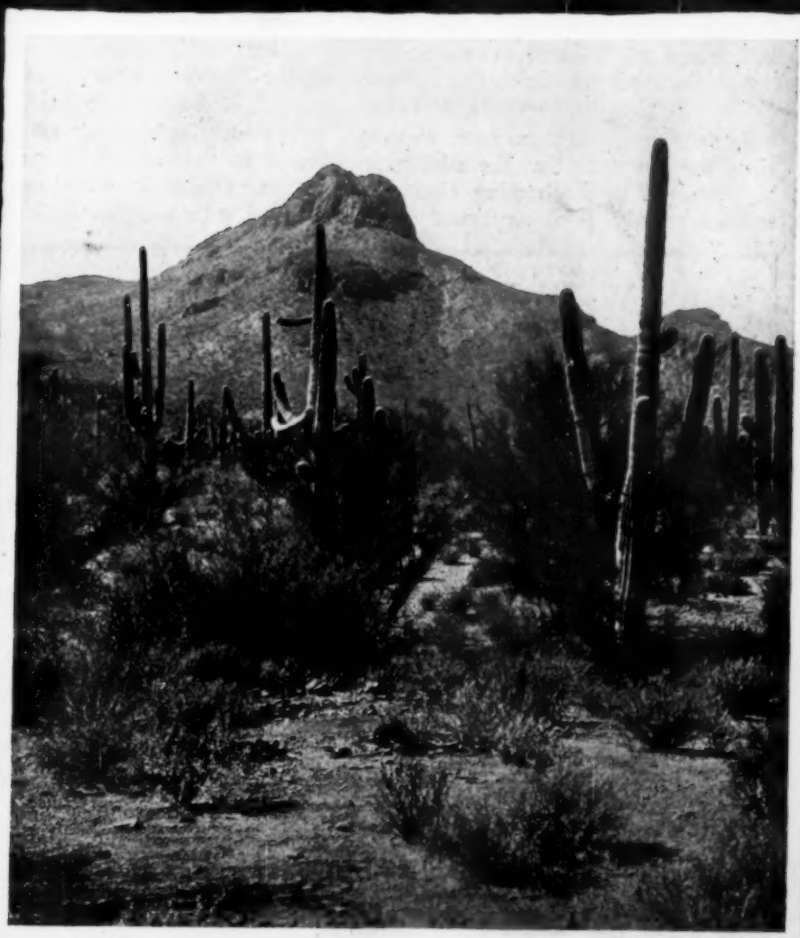
PRICE 15¢

JUL 7 1934

SCIENCE NEWS LETTER

PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



JULY 14, 1934

Defying Never-Ending Drought

See Page 22

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVI *No. 692*

The Weekly Summary of Current Science

Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—$5.00 a year postpaid; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian and Foreign subscribers please add $1 a year to regular subscription rates to cover postage.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 21st and Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

Advertising rates furnished on application.

Board of Trustees of Science Service

Honorary President, William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, *President*, Editor, Science, Garrison, N. Y.; Burton E. Livingston, Johns Hopkins University, Baltimore, Md.; Raymond Pearl, Director, Institute for Biological Research, Johns Hopkins University, Baltimore, Md. Representing the National Academy of Sciences, W. H. Howell, *Vice-President and Chairman of Executive Committee*, Johns Hopkins University, Baltimore, Md.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; David White, Senior Geologist, U. S. Geological Survey. Representing National Research Council, Vernon Kellogg, Secretary Emeritus, National Research Council, Washington, D. C.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio.

Director, Watson Davis; Staff writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter, H. C. Rowland, Jr.; Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

Copyright, 1934, by Science Service, Inc. Republication of any portion of the SCIENCE NEWS LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services listed by Science Service, details and samples of which will gladly be sent on request.

Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of $3 per year. Application for this privilege should be acompanied by privilege card obtained from the Permanent Secretary, A. A. A. S., Smithsonian Institution Building, Washington, D. C.

Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

DO YOU KNOW?

Worms are the favorite food of the burrowing mole.

Snakes have no ears, but they receive sound vibrations through their tongues.

There are more thunderstorms in July than in June, because the lower air is hotter.

Government chemists are now experimenting with the production of vinegar from honey.

A stone sarcophagus made for an Egyptian woman's burial about 600 B.C. came to be used as a drinking trough in medieval Cairo.

Locusts must face a new weapon since the discovery that the adults can be destroyed by discharging clouds of sodium arsenite from airplanes.

Polished mahogany is likely to fade in strong sunlight.

Ancient writers mention quintuplet births in Egypt, Greece and Rome.

The water ouzel is the only song bird that has learned to dive into the water for its food.

A new method of recording the color of hair with scientific precision has been developed.

The first full-blood Indian woman to become a public health nurse has begun her work among her own people on the Navajo reservation.

The main cotton belt of the United States is the only important cotton-growing area in the world not generally infested with the pink bollworm.

WITH THE SCIENCES THIS WEEK

AGRICULTURE

Why is it difficult to remove poison spray from some apples? p. 25.

BOTANY

What shape is the stem of mint? p. 31.

CHEMISTRY

How do *you* pronounce iodine? p. 25.

How much radium is contained in ocean mud? p. 29.

ECOLOGY

Why do desert plants grow far apart? p. 22. *Cactus—Laura A. Armer—Stokes*, 1934, $1.50.

ENTOMOLOGY

How many parasites has the corn borer? p. 24.

ETHNOLOGY

How is the Indian sign language being recorded? p. 29.

In what way was the California Indian's god like our Christ? p. 20.

GENERAL SCIENCE

What is the true meaning of "physics"? p. 29.

GEOLOGY

Who is the first American scientist honored by the Boverton Redwood medal? p. 23.

MEDICINE

How do the body tissues repel invaders? p. 20. *Asthma, Hay Fever and Related Disorders—Samuel M. Feinberg—Lea and Febiger*, 1934, $1.50.

How were 65 soldiers cured of epilepsy? p. 22.

What accounts for the beneficial effect of paraffin on arthritis? p. 24.

What effect has the removal of tonsils on susceptibility to rheumatic fever? p. 25.

What is the relation between influenza and distemper? p. 28.

Who identified the carrier of typhus fever? p. 26.

METEOROLOGY

What three measurements does the meteorologist make for weather predictions? p. 21.

NUTRITION

How do vitamin discoveries aid the farmer? p. 31.

How long does it take the human stomach to digest a meal of hamburger and mashed potato? p. 25.

How much nourishment does the average man need? p. 30.

ORNITHOLOGY-PUBLIC SAFETY

How can birds set fires? p. 24.

PHYSICS

How can the infrared light distinguish between the works of different painters? p. 28.

What effect does extreme cold have on the electric conductivity of lead? p. 24.

What is a neutrino? p. 30.

What precautions are now taken to protect against radium? p. 19. *Pierre Curie—Marie Curie—Macmillan*, 1932, $5.

PHYSICS-BIOLOGY

How are plant tissues protected against the heat of the electron microscope? p. 22.

PHYSIOLOGY

Why do physicians need a substiture for the usual metabolism test? p. 24.

POLITICAL SCIENCE

Who do Stanford students consider was the least effective of our recent Presidents? p. 21.

PSYCHIATRY

What trait is believed characteristic of the epileptic? p. 20. *Treatment of Epilepsy—Fritz B. Talbot—Macmillan*, 1930, $4.

RADIO

How are radio messages "scrambled"? p. 30.

What may be the cause of long delayed echoes of radio signals? p. 23.

SEISMOLOGY

How do scientists time earthquakes? p. 28.

ZOOLOGY

What are mouflon? p. 25.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, prepaid in the United States.

PHYSICS

Madame Curie Pioneered In Field Now Very Fertile

Her Dream of a Moderately Priced Source of Radioactivity Seems Now to Be Realized By Physicists

MADAME Marie Curie, Nobel Prize winner, co-discoverer of radium and the most famous woman scientist the world has yet known, died a martyr to her career of research, but her work at the Institute of Radium in Paris will go forward.

Madame Curie has been recognized for the last two years as the one woman "brain trust" behind the researches of her daughter Irene Curie and her son-in-law F. Joliot which last January showed the world how to create artificial radioactivity and transmute the elements.

Radioactivity is the natural process by which the heavier elements like uranium, polonium and radium spontaneously break up, or disintegrate. In the process the atoms of the radioactive elements throw out pieces of themselves and also release penetrating gamma radiation so useful in the treatment of many forms of cancer.

Irene Curie-Joliot and F. Joliot were the first scientists to bring about such a breaking-up process artificially in the laboratory. Madame Marie Curie, with her years of experience in the field of natural radioactivity, was a constant adviser in the research.

Madame Curie saw, like every scientist in the field, a means of obtaining a moderate-priced, easy-to-make source of gamma radiation if artificial radioactivity could be achieved. Her death came just as that humanitarian ambition is being realized, for already workers at the California Institute of Technology, Prof. C. C. Lauritsen and his colleagues, have produced radiation by artificial radioactivity which is more penetrating than any coming from the naturally radioactive elements.

Now Working Eagerly

Feverishly scientists in every major laboratory over the face of the earth are working on the problem of artificial radioactivity. Forty-four of the elements, out of the 92 known to man, which were formerly thought to be stable have been bombarded with protons, deutons and neutrons and made to undergo artificial radioactivity. Protons are the nuclei of hydrogen atoms while deutons are the nuclei of the new-found "heavy" hydrogen. Neutrons are the non-electrical particles probably composed of a proton and a negative electron in close combination.

Newest of the discoveries in the field of artificial radioactivity is the creation of a super-heavy element Number 93 by Prof. Enrico Fermi, brilliant Italian scientist. Fermi made this substance, never before known to the world, by shooting neutrons at the heavy element uranium, the "mother" substance of radium. The neutrons stuck in the nucleus of the uranium atoms and increased their weight to form the laboratory element. The work was inspired, like all similar experiments since January, 1934, by the research of the Curie-Joliots and hence, Madame Marie Curie.

Danger Not Known

When Madame Curie and her husband originally discovered radium in 1898 the danger of working with the ray-producing element was not recognized. Gamma radiation is widely and beneficially used for the treatment of many forms of cancer but only under strict and time-tried precautionary measures. In the early days workers with radium did not work behind lead screens, wear lead-lined aprons and lead-protected gloves as they do now.

By the time Madame Curie and her husband received the Nobel Prize in physics for 1903, however, it was learned that gamma radiation if uncontrolled would penetrate the bodies of the scientists and break up the cells of the blood with anemia resulting. For nearly thirty years Madame Curie has been fighting this affliction with blood transfusions and protective measures against the rays but finally, at 66, she succumbed to the ignorance of the danger she was facing when radium was first known.

MADAME MARIE CURIE

In hospitals today where radium is used it is stored in lead-lined safes. The safes are used because it is precious and worth nearly $50,000 for a gram, less than one four-hundredth part of an ounce. The lead shielding is employed to protect the workers in the hospital.

When cancer tumors are treated radium is put in a heavily shielded lead "pack." This is wheeled about and the cell-destroying gamma radiation allowed to come only from a tiny opening. The beam of rays is shot at the site of the tumor while the neighboring parts of the body of the patient are covered with a lead shield. Only the tissue over the tumor and the tumor itself are radiated.

Work With Great Caution

Workers, where they have to handle radium, do so with long tongs and work from behind thick lead shields. Every radium technician is skillfully trained now-a-days with dummy equipment before being allowed to handle the substance in reality. As an extra precaution workers are relieved from duty every month or two for a week of rest. Constant tests are made of their blood to catch any signs of anemia or other afflictions in the earliest possible stage. With such precautions laboratory technicians and scientists can now work for a lifetime without encountering the difficulties of Madame Curie in the early days of discovery in the field.

PSYCHIATRY

Study of Twins Gives Clue To Epileptic Personality

Identical Twins, Only One of Whom Has Disease, Show That Many "Epileptic Traits" are Effects of Injury

A PERSONALITY study of identical twins, only one of whom suffers from epilepsy, throws new light on the hereditary constitution of those subject to this disease. The case of these sisters, young girls strikingly similar in appearance, one of whom has been stunted mentally and in personality by the disease, has just been reported to the American Neurological Association by Dr. Walter Freeman, of George Washington University.

Physically, one of the girls might be the mirror image of the other, except that the epileptic patient is about an inch and a quarter shorter than her sister. They are similar in color of eyes and hair, skin texture, shape of ears and hands, tone of voice, and even in a peculiar and characteristic fluttering of the eyelids and marked readiness to burst into tears with slight provocation.

They have also followed very similar careers, both starting in the same occupation. Both are married—and to the same type of individual.

But the personalities and mental abilities show significant differences. Since they are identical twins with exactly the same hereditary make-up, scientists may be justified in assuming that the healthy sister presents a picture of what the other girl might have been had she not developed epilepsy, Dr. Freeman says. And their similarities in temperament throw light on what are the fundamental constitutional factors—the X-factors—present in the individual who is subject to epilepsy.

Both girls are intensely religious. As children they played at being hermits, and spent hours in a church praying. Both are deeply affected by beauty in art and music. And both are decidedly self-centered and egotistical.

Mental tests show the healthy sister to be ten points ahead of her twin in intelligence quotient; she is alert and capable while the patient is rather dull. The healthy girl has also spent her spare time in study and has qualified for a superior position. The patient is meticulous about following instructions in detail, but is content to spend her spare time in light reading or desultory conversation.

The outstanding feature in the personality of both girls is self-centeredness. This, and the supersensitiveness of both girls, may be underlying characteristics of the epilepsy-prone person, Dr. Freeman concludes. The strong religious tendency might also be characteristic of the epileptic personality, as many scientists have previously held, or it might be a result of the early training of the girls.

Other character traits of the epileptic, such as the dullness of mind, explosiveness of temper, performance by rote of instructions, which have previously been thought a part of the epileptic personality, are really effects either of the original injury to the brain which caused the epilepsy or of the repeated "insults" to the brain from the epileptic attacks, Dr. Freeman believes.

Science News Letter, July 14, 1934

ETHNOLOGY

Old Manuscript On Indian Life Discovered

THE LONG-LOST manuscript of Fr. Jeronimo Boscana, in which he described the native life of California Indians and the strange god they worshipped, has been brought to light and translated for publication by the Smithsonian Institution.

J. P. Harrington of the Smithsonian found and translated the original manuscript, which is perhaps the earliest treatise on manners and customs of California's natives. It dates from 1822, and deals with the Indians of San Juan Capistrano Mission, between Los Angeles and San Diego.

The lives of the Indians were dominated by the teachings of a god named Chinigchinix, who had once lived among them as a prophet. On his death, he was translated to heaven, where he continued to watch his people and to judge and punish them for wrong-doing.

So sacred was the temple of this god that the boys and girls did not even approach it, and the chiefs and elders who entered spoke only in low voices inside. An Indian guilty of crime, however great, could gain immunity from the justice of his fellow men by taking refuge in the temple. By doing so, the guilty one took his case to the high court of the god, and every one believed that the god would punish more effectively than man.

The Indians observed by Fr. Jeronimo had largely disappeared before ethnologists of the modern school of science began making studies of Indian life.

Science News Letter, July 14, 1934

MEDICINE

Hay Fever May be Caused By Body's Defense Forces

A NEW theory of the cause of hay fever and similar allergic disorders was presented to the meeting of the American Medical Association by Dr. Reuben L. Kahn of the University of Michigan. As Dr. Kahn sees it, these diseases are not due to a special sensitiveness of certain persons to the pollens or other offending substances. Instead it is due to overactivity of the defensive forces of these persons' bodies which protect them against invading disease germs.

It may be that in some persons these defensive forces become over-zealous about guarding against foreign invaders of a protein nature. They may fail to distinguish between harmful invaders like the pneumonia germ and innocuous substances like plant pollens and horse dander.

The body tissues respond to invaders by a complicated process, the first step in which is an anchoring of the invader at the point of entry. The second step in the process is an attempt to kill the enemy on the spot; this is a process of inflammation which may be very uncomfortable for the individual being protected.

The sneezing, nose-running and eye-watering of the hay fever sufferer may be such an inflammatory process. The consequent discomfort may be a necessary evil in overcoming a cold or similar infection of nose or throat, but it is an unnecessary evil in the case of hay fever.

The fact that many persons inhale the same plant pollens without ill effect seems to show that in themselves they are not harmful and that the symptoms they sometimes cause result from a mistake by the tissue guardians of the body.

The mistake, Dr. Kahn suggests, is the result of modern living conditions. Enclosed homes and large group contacts in the office, factory, classroom and theater may lead to over-stimulation, particularly of the defensive forces in the nose and throat, by constant bombardment with disease germs.

Science News Letter, July 14, 1934

METEOROLOGY

Nation-Wide Flights To Secure Weather Information

CLIMBING to altitudes of over three miles, Army, Navy, and commercial pilots for the U. S. Weather Bureau will now carry instruments aloft with them each day from twenty different airports, on vertical hops to record conditions in the higher air and give weather experts increased data on which to base their forecasts.

For the past two or three years commercial pilots have been making daily jaunts above the clouds to take observations for the weather man, but up until the beginning of July, mass analyses for the upper air have not been conducted on a large scale.

Each observation pilot has attached to the wing of his plane a meteorograph, an instrument which automatically records humidity, temperature, and pressure. These are the three R's in the science of predicting the waves, eddies, and cross currents of that turbulent sea, the atmosphere. In addition, the pilot notes the altitudes of the top and bottom of cloud banks, the positions and altitudes of rainstorms which pelt down into dry strata of air and never reach the ground, and local disturbances such as thunderstorms or dust clouds. Pilot balloons sent up from the ground and watched through precise telescopic instruments furnish a method of finding accurately the direction and speed of different layers of air as the small gas-filled spheres rise through them.

The use of airplanes furnishes a striking contrast to the methods of thirty years ago; the principle, however, is the same. In the days when flying was still a matter of conjecture as to its possibility, large box kites were used. These were about eight feet long and rose to altitudes of 10,000 to 18,000 feet, carrying instruments with them. They were primitive from the viewpoint of scientific precision, and dangerous when they broke loose and trailed their piano-wire kite strings along the ground.

Of the many services, regional and national, which the U. S. Weather Bureau accomplishes, Dr. C. C. Clark, Acting Chief, considers that the use of extensive airplane observations at high altitudes will be most important to commercial and military air travel. Pilots will know more definitely what lies ahead when they hop off; they will know whether they can climb to a desired altitude without encountering a snow squall or head wind, or whether danger lies before them.

Science News Letter, July 14, 1934

POLITICAL SCIENCE

Wilson Called Best Recent President; Roosevelt Fourth

THE FOURTH best of the ten most recent presidents of the United States —that is where students of political history at Stanford University rate President Franklin D. Roosevelt.

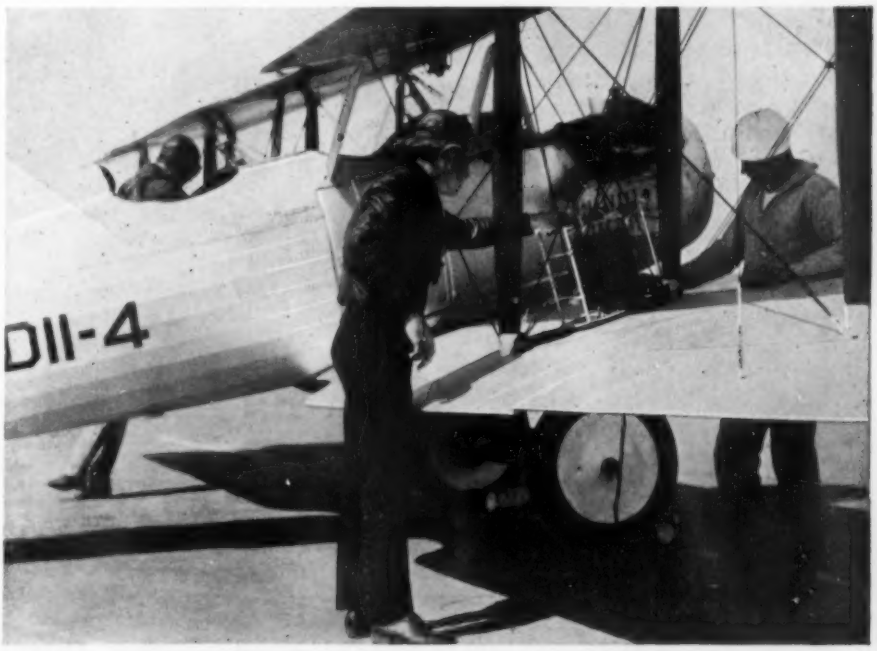
The students' ratings, just announced by Leonard W. Ferguson of the psychology department of Stanford University, list the presidents in order of effectiveness as follows:

Woodrow Wilson, Theodore Roosevelt, Grover Cleveland, Franklin D. Roosevelt, Herbert Hoover, William McKinley, Calvin Coolidge, Benjamin Harrison, William Howard Taft, and Warren G. Harding.

President Wilson was rated three times as efficient as Harding.

The students' verdict, given at the end of a quarter term of United States history study, shows a slight change from their opinions of the same presidents before study of their administrations. At the beginning, they rated the presidents in this order: Theodore Roosevelt, Wilson, Cleveland, F. D. Roosevelt, Hoover, Coolidge, McKinley, Taft, Harrison, Harding.

Science News Letter, July 14, 1934



RESEARCH IN THE SKY

Meteorographs, like the one strapped to the wing of this airplane will now be carried aloft daily by twenty pilots throughout the country to give the U. S. Weather Bureau increased data for weather forecasts. This instrument, which records temperature, pressure and humidity, is lashed to the plane with garter-like straps which are elastic and prevent vibration.

PHYSICS—BIOLOGY

Electron Microscope Tried On Biological Material

STREAMS of electrons, instead of beams of light, may be useful in future micro-biological studies, to gain sharply defined pictures of structures not readily examined by means of ordinary light.

A preliminary study of the new technique has been reported to the British science journal, *Nature*, by Dr. L. Marton of the University of Brussels. In order to overcome the heating effect of the electron stream, Dr. Marton placed his specimen, a small leaf, on a fine copper screen, so that the metal might carry off the surplus heat. To protect the tissues of the leaf against injury by the electron bombardment, they were impregnated with a deposit of the heavy metal osmium.

Well-defined photomicrographs were obtained by the new method.

Science News Letter, July 14, 1934

MEDICINE

Fear Causes Convulsions In One Type of Epilepsy

FEAR is the basic cause of convulsions in a certain type of epilepsy, Dr. E. W. Lazell of the Veterans' Administration facility at Northport, N. Y., told members of the American Psychiatric Association. This type of epilepsy is called idiopathic and is independent of organic disease, he explained.

More soldiers were discharged from the A. E. F. in 1918 for epilepsy than for any other disability, in spite of the fact that epilepsy occupied eighth place among discharges from army camps in the United States in 1917 where epileptics were eliminated. Although the actual numbers discharged in 1918 were small, they were significant because most of these men had their first attacks in the service, Dr. Lazell pointed out.

Sixty-five of these men were given treatment consisting of mental re-education and one year later most of them were free from epileptic attacks.

Studying these cases led Dr. Lazell to believe that fear is always the immediate cause of the convulsions. He found that almost all of the men suffered from fear and hatred of the world which showed itself in a Bolshevik attitude towards society, a general feeling of profound inferiority, a hopelessness of being able to adjust socially, economically, industrially or personally, an absolute intolerance of restraint and a psycho-sexual impotence.

Dr. Lazell explained how fear caused these men to have attacks of epilepsy by pointing out that in the development of the race, fear has been associated with flight, anger or rage. Since these men could not run away from or fight the conditions they found intolerable, they escaped by way of epileptic convulsions which consist of fight or flight on a reflex or automatic level.

From his experience with these patients, Dr. Lazell is hopeful that many cases of epileptic convulsions developing in adolescence can be cured by mental re-education if this is begun at the onset of the convulsions.

Science News Letter, July 14, 1934

ECOLOGY

Desert Plants Defy Their Drought that Never Ends

See Front Cover

PLANTS of the Southwestern desert might well be amused—if plants could feel amusement—over the present grievous outcry caused by the drought's menace to the softer-bodied crops of the moister areas to the east. For desert plants have learned to live in a land cursed with a drought that never ends. They do not live entirely without water—nothing can do that—but they make the most of the scant brief rains and occasional cloudbursts that come into their lives, and during the long parched intervals just mark time.

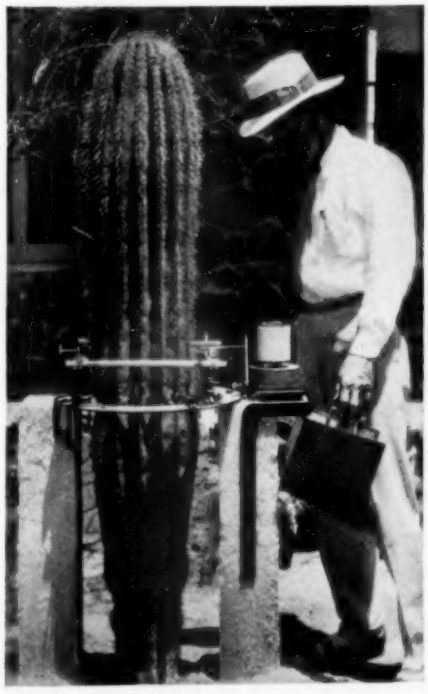
Desert plants and their ways of making a living in a hard land have been studied extensively by Dr. Forrest Shreve, director of the Desert Laboratory of the Carnegie Institution of Washington, located at Tucson, Ariz.

One route through the desert frequently traversed by Dr. Shreve in his plant-study tours follows the old Spanish "Camino del Diablo," or Devil's Highway, which lies along the U. S.-Mexican boundary between Nogales, Ariz., and a point a little below Yuma on the Colorado river. This was once the only road through the desert, and its dangers to human life are chillingly manifest through the many groups of graves that mark its course.

Yet plants live in this deadly land. Not many kinds of them, nor many individuals when all kinds are counted together. But they do survive, tough evidences of the tenacity of properly adapted forms of life.

Most numerous are the creosote bushes, low, rounded, grayish-green leaved shrubs. So much ground space must each have for its spreading wheel of roots to search for moisture, that they do not, as a rule, grow closer together than at ten-foot intervals in favorable areas, and they may be as sparse as a mere dozen plants to an acre.

So rigidly limiting to plant abundance is this factor of soil drought, that when the scientists find any kind of plants growing close together they immediately suspect something unusual about the



DOES A CACTUS PANT?

The instrument under the scrutiny of the Carnegie Institution scientist, Dr. Forrest Shreve at the Desert Laboratory, Tucson, Ariz., is designed to measure small changes in diameter occurring over short time periods, as the plant alternately gains and loses water.

BEAUTY FLAUNTED AGAINST DEATH

Lovely as the houris of Arabian desert legend, are the flowers of many species of cactus. They need not wait for kindly weather, but can open in the midst of desolation, for their needs are supplied from the stubbornly hoarded water in the thick, succulent joints of the stem.

soil conditions. Thus, when a thicket of mesquite bushes was discovered in the midst of a desert plain, they dug into the ground to find out why.

They discovered that the soil consisted of a fine alluvial clay, and that several streamways poured their water over the entire plain in the violent rains that come at intervals in summer. These mesquite bushes stood at a point where such water was concentrated underground from a wide area, and the moisture on which they throve so well remained nearly constant and wholly adequate to their needs at a depth of five to ten feet, no matter how dry and hot it was on the surface.

Science News Letter, July 14, 1934

A new rubber cement for tree wounds is said to retain its plasticity, so that it does not crack nor shrink away as the tree grows.

Calendar reform advocates are interested to find the government preferring the four-week month, thirteen-months-year system as the time unit for measuring industrial progress.

RADIO

To Make Survey of Delayed Echoes of Radio Signals

Owners of Short Wave Sets are Asked to Cooperate With National Bureau of Standards in Project

RADIO engineers are setting up the framework of a world-wide plan to trace the mystery of puzzling long radio echoes. The round-the-world echo is a well known phenomenon occurring one-seventh of a second after the original signal. This echo represents the time for the wireless wave to circle the earth. Long-delay echoes, however, may occur as much as three seconds after the primary signal.

Dr. J. H. Dellinger, chief of the radio section of the National Bureau of Standards, has asked Science Service to acquaint owners of short-wave sets with the plan for investigating these long-delay echoes, and thus aid the solution of the mystery of their origin.

The British Broadcasting Corporation is coordinating the survey on a world-wide scale. Ten thousand listeners in Great Britain are already entered in the project.

Two high-power high-frequency stations are transmitting special signals to facilitate observations by anyone who cares to listen with a short-wave receiving set. They are: GSB, Daventry, England, and HBL, Geneva, Switzerland (the League of Nations station).

GSB transmits a 1,000 cycle note on a frequency of 9510 kilocycles each Sunday, Tuesday and Thursday, from 3:25 to 3:55 a. m., Eastern Standard Time.

HBL transmits on 6675 kilocycles each Sunday, Wednesday and Friday from 6:00 to 6:30 a. m., E.S.T.

Each transmission, Dr. Dellinger explains, consists of a five-minute adjusting period, followed by the letters of the alphabet in Morse code at one-minute intervals. During the interval between signals observers are asked to listen for echoes and check the elapsed time with a watch having a second hand.

GSB can be picked up on an ordinary short-wave broadcast program receiver, but HBL requires an oscillating receiving set.

"In recording observations," Dr. Dellinger says, "listeners should give the identifying letter of the signal observed, the time to the nearest second at which the direct signal was heard, and the time to the nearest second at which the echo was heard. In addition an estimate of the relative intensity of the direct and echo signal, a description of the sharpness or apparent shape of the echo, and any pertinent information on interference, fading of signals, or other conditions of observations will be helpful in the survey."

It is hoped that data collected from thousands of individuals will help clear up the controversy over the cause of the long-delay echoes.

Dr. C. Störmer of Norway believes that there are streams of charged electric particles, the electrons, out in space some hundreds of thousands of miles from the earth's equator. These electrons, converging on the earth's magnetic poles, account for the northern lights. The long-delay echoes, by Störmer's theory, are reflections from such electron streams in space.

The other theory of long-delay echoes, advanced by Dr. B. Van der Pol of Holland and others, suggests that the echoes are due to a slowing up and a reflection of the radio signals from a peculiar distribution of ionization occurring in the ionosphere. The ionosphere is that portion of the earth's atmosphere 65 miles and more above the surface of the earth which is responsible for all long-distance radio transmission.

Science News Letter, July 14, 1934

GEOLOGY

High British Award Comes To American Geologist

DR. DAVID WHITE, eminent scientist of the U. S. Geological Survey, has been awarded the Boverton Redwood medal by the Institution of Petroleum Technologists in London, according to word just received in Washington. This is the first time that the medal, highest award of the institution, has been given to an American.

Science News Letter, July 14, 1934

ORNITHOLOGY—PUBLIC SAFETY

Birds With the Cigarette Habit Cause Fires

A NEW feature in the dangers of the nicotine habit arises with the report that many fires have been traced to small birds who pick up lighted cigarette butts from the street and, leaving a trail of smoke like a tracer bullet, carry them off to their nests in the eaves of old buildings or warehouses.

A report to the Railway Fire Protection Association states that the representative of a well-known fire insurance company charged small birds, the sparrow in particular, with being firebugs. The origin of this new angle of fire-causes is an incident in which an abandoned theater in Rockwood, Tenn., was destroyed by a fire originating at a point where sparrows made their nests.

As the narrative goes, citizens sitting in the cool of the evening before the town hotel had seen sparrows pick up discarded cigarettes and fly off with them still burning.

Fire-Chief Johnson, of Knoxville, was also quoted as having accused small birds of starting fires. He reported that a locomotive engineer whom he knew had seen a sparrow pick up a lighted cigarette and fly away with it, leaving a thin wraith of smoke behind him, to the eaves of a nearby dwelling. Several days later that house had been destroyed by fire.

Science News Letter, July 14, 1934

MEDICINE

Paraffin Bath Used To Treat Arthritis

BATHING rheumatic joints of hands, feet, wrists and ankles in hot paraffin is a valuable means of treating these conditions in arthritic patients, Dr. Barnard Langdon Wyatt of Tucson, Ariz., has reported to the American Congress of Physical Therapy.

The paraffin bath enables the physician to apply greater heat to the painful, crippled joints than is possible with solutions, packs, foments, oils or radiant heat, Dr. Wyatt explained. The reason seems to be because a tiny insulating space forms between the patient's skin and the inner layer of the paraffin coating which he gets over his hands or feet when the paraffin bath is used according to Dr. Wyatt's method. The insulating space helps the patient to endure very high temperatures. The high temperature causes an increased supply of blood to the affected part which relieves the pain and stiffness and enables the patient to move his joints more freely.

The paraffin treatment produces more prompt and longer lasting relief of symptoms than other methods of applying heat, Dr. Wyatt has found. He does not recommend using this method exclusively in treating arthritis, but points out that it is valuable in conjunction with such other forms of treatment as rest, diet, elimination of infections, drugs, vaccines and the like, according to the requirements of the individual patient.

Paraffin baths have been extensively used in Europe for treating arthritis but have not been very popular with American physicians, Dr. Wyatt stated. He described a new type of apparatus for giving them which he believes will eliminate the objections of physicians in this country.

Science News Letter, July 14, 1934

PHYSICS

Electric Conductivity of Gold Unchanged With Cold

PRODUCING extreme cold only fifteen hundredths of a degree above absolute zero, the "farthest south" of temperature, Drs. W. F. Giauque and D. P. MacDougall of the University of California find that gold remains electrically steadfast under this extreme treatment and does not become less resistant to electricity as do all other metals so far tested. They reported this result, at variance with the effects of extreme cold on other metals, before the meeting of the American Association for the Advancement of Science.

To the wonder of scientists, lead, tin and other metals cooled to near the lower limit of temperature became superconducting, that is, an electrical current would flow nearly unimpeded in a coil for hours.

Failure of gold to act in this way interests scientists greatly, and they are eager to know whether the yellow metal will become superconducting in the mere fraction of a degree of temperature remaining for cold to be pushed.

The record low achieved so far by Drs. Giauque and MacDougall is a tenth of a degree above absolute zero. This is very nearly the world's record cold.

Science News Letter, July 14, 1934

IN SCIENC

PHYSIOLOGY

Blood Flow Rate Gauges Physiological Processes

THE WAY in which the human body is using its energy in its business of living, what the physiologists call basal metabolism, can be determined approximately from a patient's pulse rate and blood pressure, Drs. J. Marion Read and Charles W. Barnett of the Stanford University School of Medicine reported to the meeting of the American Association for the Advancement of Science.

This indirect measure of the amount of oxygen required at the moment by the body is expected to prove of practical use in fighting disease, particularly those ills accompanied by fever.

The making of a standard basal metabolism test requires complicated apparatus and the fasting of the person for fourteen hours before the test. The new approximate method is intended to allow the physician to count the pulse, take records of the contraction and expansion beats of the heart, and then compute the metabolism rate to within about ten per cent.

Science News Letter, July 14, 1934

ENTOMOLOGY

European Corn Borer Common in Far East

THE EUROPEAN corn borer is not limited to Europe—nor the United States—but occurs in China as well, says Dr. W. B. Cartwright of the U. S. Department of Agriculture. Searching primarily for insect parasites which might be developed to a point where they might be utilized in the control of the corn pest, Dr. Cartwright found corn in Japan, Formosa, Korea and eastern China infested during his investigations in 1928-1930.

In these regions, Dr. Cartwright reports that the pest not only attacks corn, but also millet, sorghum, hemp, beans, indigo, and hops.

Dr. Cartwright's searches were rewarded by the discovery of thirteen active parasites of the borer.

Science News Letter, July 14, 1934

NCE FIELDS

CHEMISTRY

Pronunciation of Chemical Names Is Determined

HOW do you pronounce iodine? Or chloride?

A list of 361 such questions has been sent to 400 American, Canadian, and British chemists by the American Chemical Society in order to get an idea of the most prevalent ways of pronouncing the terms.

The list of answers shows that iodine and chloride are almost universally pronounced "iodeen" and "klorid," the *i* in chloride as in rid. Other ordinary words which seem to present difficulties are citrate and oxide. Citrate appears with a short *i*—"sit-rate," and oxide is pronounced "ox-id," also with a short *i*.

Quinine seems to worry the chemist as much as the layman. It has two pronunciations, kwi (as in "quill")-neen and kwinine with both *i*'s long as "eye," the second being the most popular usage.

One reason which the American Chemical Society gives for the variations in technical terminology is the international nature both of science and the men who deal with it. A great number of our students travel yearly to foreign universities for post graduate work, and many foreign students come to American institutions.

The resulting oral polyglot is attributed to words which in a great many cases have the same spelling here and abroad, but which pick up new pronunciations on the tongues of many different nationalities.

Science News Letter, July 14, 1934

MEDICINE

Throat Secretion Seems To Combat Rheumatic Fever

SOME CHILDREN may be safeguarded from rheumatic fever by an enzyme or secretion back of the nose or in the upper part of the throat. Less fortunate brothers and playmates who do not have this protecting substance are unable to resist an attack of the disease.

This suggestion was made by Dr. Albert D. Kaiser of Rochester, N. Y., who reported a study of twelve hundred rheumatic children at the meeting of the American Medical Association.

Rheumatic fever is a serious disease not only because of the pain and disability during an attack but also because it may seriously affect the child's heart. Many deaths from heart disease in the early thirties are attributed to childhood attacks of rheumatic fever.

Control of rheumatic disease will not be achieved until physicians understand better why some children are susceptible and others can resist it, and more is known of its cause, Dr. Kaiser asserted.

Social and economic factors do not play any significant role in the malady. In the children whom Dr. Kaiser studied, the most severe attacks followed attacks of tonsillitis and dental infections. Tonsillitis or sore throat preceded the rheumatic attack in more than half the cases.

Removing a child's tonsils when it has an attack of rheumatic fever does not seem to have much effect, either on the severity of the attack or in warding off subsequent attacks. But the child whose tonsils are removed before he has had an attack of rheumatic fever has twice as good a chance of surviving as the child whose tonsils are still in when he gets his first attack.

Removing the tonsils seems to give the child a little better chance of escaping the disease; but Dr. Kaiser thinks that whether a child gets rheumatic fever or not hinges on whether he is susceptible to it or has resistance.

Science News Letter, July 14, 1934

AGRICULTURE

Waxy-Coated Fruit May Retain Spray Poisons

CLEANING of apples for the removal of deleterious particles of lead and arsenic deposited during preventive spraying may not always be effective, especially when an oil spray has been used, according to Drs. K. S. Markley and Charles E. Sando of the U. S. Department of Agriculture.

The scientists state that when the apple has a very thick cuticle, or waxy coating, and it has been sprayed with an oil spray, there may be a dissolving effect on the cuticle and the lead and arsenic particles become embedded in a waxy matrix and not, therefore, amenable to any cleansing bath.

Science News Letter, July 14, 1934

NUTRITION

Meat-and-Potatoes Diet Receives Medical OK

THE COMBINATION of meat and potatoes at the same meal was given the stamp of scientific approval at the meeting of the American Medical Association. The dictum put forward by some food faddists that proteins such as meat, and carbohydrates such as potatoes and sweets should not be eaten at the same meal was called incorrect, dangerous and lacking in scientific justification.

Experiments on patients in a hospital showing that even chronic invalids could properly digest the combination of meat and potatoes were reported by Dr. Martin Rehfuss of Philadelphia. The patients were sufferers from stomach, heart, kidney, liver, or lung diseases and infections. The average time their stomachs required to digest a meal of Hamburg steak alone was three hours and fifty-one minutes. A meal of Hamburg steak and an equal amount of mashed potatoes required three hours and fifty-four minutes. When butter was added to the potatoes and meat, another eight minutes was required for the stomach to do its job.

"There is no evidence either in scientific literature or our investigations to lead us to believe that proteins and carbohydrates are incompatible in the stomach," Dr. Rehfuss declared.

It may be true that many persons overeat and would be better off with less carbohydrate in their diet, Dr. Rehfuss observed. But the teaching that these two classes of foods can not be eaten together is dangerous because it may lead to serious undernourishment and lighting up of tuberculosis and other old infections.

Science News Letter, July 14, 1934

ZOOLOGY

Mouflon are Thriving In Mountains of Germany

MOUFLON, the European equivalent of the American bighorn or Rocky Mountain sheep, are thriving mightily in the Harz mountains, which lie in north central Germany, about halfway between Berlin and Cologne.

A nucleus of twenty animals was introduced in these mountains in 1905. Now the herd numbers about 250.

Science News Letter, July 14, 1934

MEDICINE

The Challenge of Tabardillo

In Mexico, Dr. Howard Taylor Ricketts Gave His Life To Conquer This Dread Disease of Poverty and Filth

By JANE STAFFORD

IN MARCH, 1910, a determined scientist climbed wearily aboard a train in Chicago. He was on his way, for the second time within a year, to Mexico City where an epidemic of dread tabardillo or Mexican typhus fever raged.

He was Howard Taylor Ricketts, charming, beloved and brilliant American disease fighter. The month before, he had celebrated his thirty-ninth birthday. In the prime of life, he was already distinguished for his medical research and a brilliant career beckoned.

The University of Pennsylvania had just invited him to be professor of pathology. It was like getting a nice birthday present of an assured future. When he accepted, he arranged to take up his new duties in the fall.

Meanwhile he had a job he wanted to finish in Mexico in the thick of that seemingly hopeless fight against the epidemic.

The Mexicans called the disease that was plaguing their country tabardillo. Sometimes it was called American or Mexican typhus fever. Medical scientists were not sure whether it was the same disease as the typhus fever that raged in Europe, and America, too, whenever wars or famine or extreme poverty crowded people together in filthy, vermin-infested and squalid quarters. That was one point Dr. Ricketts was trying to settle.

Claimed Most Victims

Typhus fever was a doughty foe for any disease fighter to tackle. No other disease has claimed so many victims among physicians and nurses and it is not uncommon among laboratory investigators. Throughout the ages it has taken a terrific toll of all classes of people. It was always especially common among the poor, huddled together for warmth in their tiny cottages, and among the prisoners crowded together in the filthy jails of earlier centuries. It followed closely on wars and on famines. At first it was confused with other fevers, but in about 1700, physicians learned to distinguish it by its sudden onset, short duration of fever and characteristic rash. This consists of irregular, raised red spots which sixteenth century physicians described as looking like flea bites.

It took several centuries more for men to learn that while the rash merely resembled flea bites, the disease is actually transmitted by the bite of a flea. Those sixteenth century physicians never knew how close they were to the true solution of the typhus fever problem with their casual references to flea bites. Neither, with two exceptions, did the other physicians before 1909 have any inkling of the importance of fleas and lice in the disease, although they began to notice that it was always associated with filth and vermin.

But Ross, in India, found that mosquitoes carried malaria, and in Panama, Reed and his colleagues showed that mosquitoes also transmitted yellow fever. Flies were next shown to carry typhoid fever. By 1909 there were rumors that some insect probably carried typhus fever.

Lice Carry Disease

Then, in 1909, just before Dr. Ricketts made his first trip to Mexico, a French army surgeon, Charles Nicolle, whiling away the hot hours at his post in tropical Algiers by trying to give typhus fever to monkeys, showed that lice could carry the disease.

Dr. Ricketts had had a notion of his own, before he ever heard of Nicolle's work, that ticks might carry typhus fever. He had just made the important discovery that ticks carry an apparently similar disease, Rocky Mountain spotted fever, from one animal to another by their bite.

He made this noteworthy discovery on a vacation. He was that kind of a man, enthusiastic, persistent, tireless and fearless in his search for facts. When he was still a student at Northwestern University Medical School and later a research fellow at Rush Medical School, Chicago, he was known for the ability and energy with which he pursued his studies. After graduating from medical school, he decided not to enter on active practice, but to devote himself to teaching and research. He proved to have an instinct for research, according to Dr. Ludwig Hektoen, his chief, at the University of Chicago and the McCormick Institute for Infectious Diseases.

He had worked so hard at his job in Chicago that in the spring of 1906 he was obliged to lay off and rest for a while. He had gone to Montana, and, just by way of pastime, this indomitable disease-fighter took up the study of Rocky Mountain spotted fever.

At that time this highly fatal disease was more of a curiosity than a problem to medical scientists, except for the few physicians and health officers in Montana who were called on to handle cases of it. The disease seemed to be limited to one part of the state, the Bitter Boot Valley, and it only attacked sheep-herders, hunters or others whose business or pleasure took them to certain remote parts of the valley in the spring. This disease, like typhus fever,

DR. HOWARD TAYLOR RICKETTS

ANOTHER PIONEER

The dramatic story of the great sacrifice of Dr. Ricketts in the cause of humanity provides the theme for the second of a series on Pioneers of Medicine.

is characterized by a high fever and a peculiar rash. No one knew what caused it or how to avoid it.

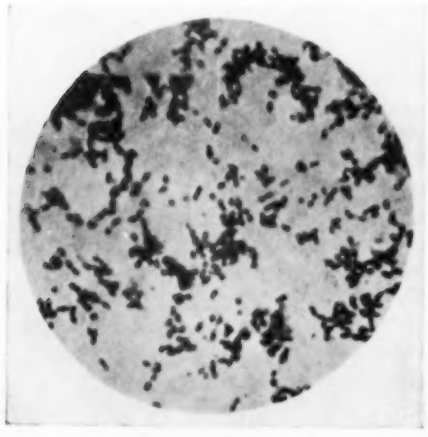
Not long after Dr. Ricketts arrived in the valley for his much-needed rest, he saw one or two acute cases of this mysterious malady. His scientific imagination was promptly fired and, rest or no rest, he had immediately started working on the problem.

Tick Is Guilty

It did not take him long to discover that animals other than man suffered from the disease, and that a cetain tick, occurring naturally in the valley, carried it from animal to animal. Dr. Ricketts spent three years on the Rocky Mountain spotted fever studies, during which time he acquired considerable knowledge and skill at investigating this type of disease.

All the time he worked on the spotted fever, he became more and more impressed with how much it was like typhus fever. So in July, 1909, he had decided to put this new special knowledge to work on the typhus problem. There was apparently no typhus fever in the United States at that time, but in Mexico where it was called tabardillo there was plenty of it, amounting to an epidemic.

It was just at this time that Nicolle announced his epochal discovery about the lice, but Dr. Ricketts decided to carry out his plans nevertheless. There was still plenty of mopping-up work for a daring disease fighter to do in the typhus field. There was, for one thing, a need to settle the question of whether tabardillo and typhus were the same disease. Likewise, Dr. Ricketts felt he need not abandon his theory about the ticks just yet. Ticks might play a role in transmitting the disease as well as lice. And, finally, no one had yet found the germ or micro-organism that caused this dreadful disease.



RICKETTSIA BODIES

They are named for Howard Taylor Ricketts who first saw them in the blood of typhus fever patients and believed them to be the germs causing the disease.

So in the fall of 1909 Dr. Ricketts, according to schedule, had departed on his first visit to Mexico City. He had realized fully the dangers he was facing. He had known, too, that he did not have to go. He could have remained at the McCormick Institute of Infectious Diseases, a place "handsome and out of the wet," but he had preferred to tackle the dangerous problem of typhus or tabardillo in Mexico. People were dying of tabardillo down there. Maybe, with his new and special knowledge of disease-fighting, he could find a way to stop those deaths and to check the epidemic.

Inject Into Monkeys

He had taken with him an equally daring volunteer assistant, Russell M. Wilder. The two of them had spent the winter injecting into monkeys blood from the tabardillo patients, who crowded the city's hospitals, and in feeding lice and ticks on typhus- or tabardillo--infected blood and then on healthy monkeys. It was not many weeks before they had found that typhus fever is quite different from Rocky Mountain spotted fever, although there are similarities between the two diseases.

Next they had repeated Nicolle's experiments of injecting blood from fever patients into chimpanzees and monkeys, and of letting lice feed first on the infected and then on healthy monkeys. They had confirmed his discovery, that lice can carry the disease from the sick to the well. They also showed that the tabardillo of Mexico and the typhus fever of the Old World were really the same disease.

They had put ticks to feeding on typhus-infected monkeys and on typhus patient's blood, and then on healthy monkeys, but with no results. The ticks do not carry this disease.

Dr. Ricketts had made one more notable discovery. In the blood of typhus fever patients and in the lice that had fed on them he had found a tiny micro-organism which is apparently the germ that causes the disease. This tiny organism has been called Rickettsia, after its discoverer. It is rather generally accepted as the cause of the disease, although some scientists think that the case for the Rickettsia has not been conclusively proved.

In the midst of these investigations, Dr. Ricketts made a flying trip back to Chicago. There he had attended to some personal affairs, including the birthday celebration and the matter of the Pennsylvania professorship. Then for the second time, he said good-bye to his wife and two children. In fact, he probably said "Au revoir," for he expected to be back within a few months.

His friends had hated to see him start again for the fever-ridden city, because he was already worn out from overwork and should have been resting. But he was an indomitable and brave disease fighter, and before taking up his new duties that might keep him tied down to his professorial chair for years, he wanted one more chance at the typhus fever problem which then seemed so near solution.

Today typhus fever has been conquered. A means of preventing this ancient plague is at hand. But when Dr. Ricketts started for Mexico on that long ago March day, it was still one of medicine's unsolved problems and the disease fighter's deadliest foe, as well as the greatest challenge to his skill.

Valiant Dr. Ricketts, who was so eager to take up that challenge, never had a chance to complete the conquest of typhus fever. For, back in Mexico the second time, he had barely gotten started in his work with the monkeys and the lice and the blood containing the Rickettsia of typhus fever, when he was taken ill himself.

Tired Out

One friend thinks he fell a ready victim to typhus fever because he was tired out when he left on that second fatal trip to Mexico.

They took him to the American Hospital in Mexico City, where loyal Russell Wilder saw that he had every care. But he died on May 3, a victim of the pestilence he was investigating.

A signal honor was shown his memory, when, by special order of President Diaz, all the professors and students of the National Medical School of Mexico stood at attention as his body was carried aboard the train that took it back to his sorrowing wife and friends in Chicago.

Science News Letter, July 14, 1934

Rattlesnakes sometimes develop more than one rattle in a year, or lose rattles; hence the age of a snake cannot be reliably found by counting the rattles.

SEISMOLOGY

Research Aimed at Future Prediction of Earthquakes

YOU CAN NOT accurately predict something you do not thoroughly understand. This summarizes briefly the reply of Dr. H. O. Wood, Pasadena seismologist, to important questioners who want to know right away whether —or when—California is to have a great earthquake. Speaking at the University of California, Dr. Wood nevertheless reminded his questioners that the Southwest has had some stiff jolts in the past two hundred years.

Although the questioners were impatient, there is some justification for their solicitude. A large part of the educational system of California is in turmoil, with thousands of pupils in tents because of doubt cast on the stability of school buildings.

As seismologist for the Carnegie Institution of Washington Dr. Wood outlined in part the formidable program of research in pure science which must be carried out before earthquake forecasts can even be hoped for. At present the possibility of measurement of earth tilt at critical locations offers a beginning. Development of "tilt meters," whose design will undoubtedly require years of study, may permit advance information on coming temblors.

The main feature of Dr. Wood's research plan is a network of stations tributary to headquarters at Pasadena, and ranging from the Owens Valley to San Diego. High precision in the agreement of timepieces in these stations is very desirable, and is difficult by ordinary chronometer practice. Recently the outlying stations are receiving periodic signals from a single broadcasting station. Marks on different time charts made by such time signals need not agree with Pacific Standard Time, but do agree with each other, and accurately tell the relative time at which earth motion took place. In this manner accuracy of one quarter-second is easily attained, and sometimes as high as one-tenth second.

Incidentally, the Pasadena observers note that the time duration of local shocks proves nothing about the time elapsed during the original rock-slip, or blow that started the trouble. Recently a huge single dynamite blast at Victorville, fifty miles from Pasadena, caused a thirty-second "earthquake" at the latter city. For a full half minute the seismographs continued to record the tremblings of the earth.

Current investigations seek to determine why all this extension and multiplication of motions. Possibly there are several distinct layers of the earth's crust in which the waves are carried, reflected, or refracted. What sort of maneuvers an earthquake shock carries out to extend itself from a single wallop to a half-minute shiver—that is still to be learned.

Science News Letter, July 14, 1934

PHYSICS

Infrared New Detective Aid to Art Connoisseurs

INFRARED light, invisible to the human eye, has come to the aid of art connoisseurs in their search for the truth about questionable masterpieces of painting.

Infrared photography can be successfully used to detect the chemical composition of the paints that an artist employed on a canvas. So the American Association of Museums was told by Dr. Maximilian Toch, well-known New York chemist and specialist in scientific methods of examining paintings.

Even though two strokes of green paint may look alike to the naked eye, the infrared light will photograph one white and another black, if one is chromium oxide green and the other chrome green. Since certain pigments did not come into use by artists until certain historic periods, and since famous artists tended to choose the paints that best suited them, the kind of pigment on a canvas may be a significant clue to its age and authenticity, Dr. Toch showed.

"My contention," said Dr. Toch, "is that all pictures of a certain period by the same artist were painted with the same type of pigments, for even today one seldom finds a painter of note who flounders around and changes his pigments every few months.

"In the case of Frans Hals, Van Dyke, and men of that period, it is quite obvious that they had very few pigments to choose from and therefore any one of those paintings would show characteristic effects on the infrared plate. If, however, a student two hundred years later who ultimately became famous, copied one of these paintings, his work may be accepted as genuine—yet the pigments might be so totally different that the infrared might show them up completely."

Dr. Toch stated that he has photographed a large number of colors by infrared, all of which might be used as standards. Almost every color in use today is recorded.

Science News Letter, July 14, 1934

MEDICINE

Dog Distemper May Give Weapon Against Influenza

POSSIBILITY that the virus causing dog distemper may provide man with a new weapon against influenza appears in a report of Drs. Adolph Eichhorn and Norman J. Pyle, veterinarians of Pearl River, to the American Medical Association.

The virus of human influenza apparently makes ferrets immune to attacks of dog distemper, Drs. Eichhorn and Pyle found. Their investigations suggest that the two diseases, influenza in man and distemper in dogs, are related somewhat as smallpox in man is related to the bovine disease, cowpox.

Vaccination of human beings against smallpox depends on this relation. Smallpox vaccine is made from the virus of cowpox. If distemper and influenza prove actually to be related, scientists may be able to develop from the distemper virus a vaccine that will protect against influenza. So far no successful vaccine against influenza has been developed. Drs. Eichhorn and Pyle are now working on experiments to determine the possibilities of producing such a vaccine from the dog distemper virus.

Their work so far has been confined to ferrets and their discovery that influenza protects these animals against distemper was made accidentally. They had been using ferrets for routine tests of canine distemper virus, when they decided to study an influenza virus obtained from human cases of the disease by the British investigators, Wilson Smith, C. H. Andrewes and P. P. Laid-

law. The virus produced influenza in ferrets, just as the British investigators had reported. Much to the American scientists' surprise, however, they found that the ferrets after recovering from an influenza attack were immune to the distemper virus given for the routine tests of the latter.

Claims have been made before now that influenza and distemper are related but so far no definite proof has been presented of the identity or relationship of these viruses. Drs. Eichhorn and Pyle believe their experiments strongly point to such a relationship.

Science News Letter, July 14, 1934

GENERAL SCIENCE

Science Neglected Because Scientists Glorify Analysis

BECAUSE many scientists have taken a perfectly reputable Greek word and twisted it far out of the meaning it had for the Greeks who first used it, scientists today are having ever-increasing difficulty maintaining public confidence and material support. Thus, in effect, declared Prof. Wm. E. Ritter of the University of California, in a report to the American Association for the Advancement of Science.

"Surely no half-observant, sensitive worker in science today can avoid anxiety for its welfare," said Prof. Ritter. "The ground for such anxiety that may be noticed first is the tendency shown everywhere (except, ominously, in Russia) to make scientific research a special target of economy in financial expenditures. Illumined by what we have all heard and seen in this matter during the last two years particularly, it would be mere waste of time to prove the reality of that tendency."

Even graver than the withdrawal of financial support, however, Dr. Ritter considered the suspicion with which science has come to be viewed by many of the world's most influential intellects in non-scientific fields.

He expressed the feeling that this lack of confidence in science, by both legislators who control treasuries and philosophers who set fashions in opinions, is due in large part to the activities of many scientists in the past, who have over-stressed the value of analytic science, the kind of science that "picks things to pieces to see what makes them tick," and who have set this analytic science up as distinct from, and opposed to, synthetic science which views as wholes, and the great inclusive universe of things as itself a whole.

So far has this glorification of analysis proceeded, Prof. Ritter pointed out, that its typical and outstanding development has captured for itself the name "physics," which in its original Greek form "phüsis" meant simply "nature."

To the Greeks "phüsis," or "nature" had both analytic and synthetic shades of meaning, Prof. Ritter's inquiries into the uses of the word have convinced him, though they strongly favored the synthetic aspect at the expense of the analytic.

Prof. Ritter feels that to regain its lost ground and make further progress, science must re-emphasize the principle that analysis and synthesis are not opposed, but properly form a continuum.

Science News Letter, July 14, 1934

ETHNOLOGY

Blackfoot Indian Makes Sign Language Dictionary

THE dictionary of the Indian sign language is at last being finished.

Richard Sanderville, 70-year-old Blackfoot Indian, has come to Washington, D. C., to put the Indians' universal language on scientific record. He makes the signs with his hands. They are photographed by motion picture camera. They will be recorded on cards, several thousand cards, together with the English words they represent. And so the dictionary will be made.

At the Bureau of American Ethnology, where Mr. Sanderville is at work, he paused long enough to show how Indians talk when they meet other Indians of some foreign-speaking tribe.

A man on a horse is indicated by forking two fingers of one hand and setting them astride the fingers of the other hand. A proud person is shown by flinging back the head and holding one fist under the chin, thumb up, and the other fist below that thumb up.

ISN'T IT HOT!

The Indians have a sign for it—the hot weather, that is to say. Richard Sanderville, 70-year-old Blackfoot Indian has come to Washington to finish a dictionary of the Indian sign language for the Bureau of American Ethnology. To make the sign for hot weather, you simply spread out your hands before you, like the sun's rays bearing down. It's expressive, all right.

Indian sign language is old, but it adds new words to keep up with the times. An automobile is shown by jiggling the hands as if steering a wheel. For an airplane, you wave the arms at sides and then rotate one hand like a propellor.

Indians from coast to coast understand the international language of signs, says Mr. Sanderville, though the younger generation pays less attention to it.

Science News Letter, July 14, 1934

CHEMISTRY

More Radium in Ocean Mud Than in Rocks of Dry Land

MORE radium exists in the mud of the sea than in the ordinary rocks of dry land, Dr. Robley D. Evans of the University of California has found. His tests show that radium is being deposited constantly by ocean waters.

There is no hope of mining sea mud for radioactivity. Dr. Evans made his experiments merely to test his new method of detecting extremely minute amounts of radium and radon gas emitted by radium. Each ounce of mud contains three trillionths of an ounce of radium.

Science News Letter, July 14, 1934

▼ RADIO ▲

THE ENGINEER'S CONTRIBUTION TO NATIONAL DEVELOPMENT

an address by

Col. D. H. Sawyer

Director of Federal Employment Stabilization Office

Wednesday, July 18, at 3:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

RADIO

Japanese Have New Means Of Secret Radio Telephony

THE JAPANESE are in possession of a secret which enables wireless stations to transmit the human voice so that it is entirely incomprehensible to the average listener-in, the Radio Research Committee of Japan's National Research Council has reported.

Dr. Shigetaro Chiba of the research laboratory of the Tokyo Electric Company says that his method is superior to other methods of secret telephony because of its simplicity and the good quality of speech received.

The set he uses is equipped with a microphone constructed so that the speech current is inverted with respect to frequency, making it unintelligible. At the receiving end the same sort of equipment is used, which demodulates the speech by inverting it back to normal. Anyone else listening in, however, hears only a queer jumble.

A more or less secret method of voice transmission is employed at present in transatlantic radio-telephone communication to keep radio fans from eavesdropping on private conversations.

This process is known as scrambling but it does not work in the same way as the Frequency Inversion Method employed by the Japanese. To "scramble," the radio waves produced by the voice are split into four parts. An instrument known as a Privacy Hybrid Set sends each part out over the air on a different wavelength. Anyone listening in would hear only the staccato sound of one of these parts.

Science News Letter, July 14, 1934

PHYSICS

Double-Weight Neutrons Added to Units of Matter

STILL another sub-atomic particle may have to be added to the rapidly growing list of matter's building-blocks which have been discovered during the past year. Double-weight neutrons may exist, Dr. M. A. Tuve of the Carnegie Institution of Washington suggested in a report to the American Association for the Advancement of Science.

Describing recent experiments performed jointly with his colleague, Dr. L. R. Hafstad, the Carnegie Institution scientist told of driving deutons, the hearts of atoms of heavy hydrogen, into a gas composed of the same substance. The atomic impacts drove streams of protons (the positive cores of ordinary hydrogen) out of the apparatus with varying ranges of flight. This difference in the length of path which the protons travel does not fit in with atomic theory.

Knowing the weights of the atomic particles involved, Dr. Tuve suggested that what is needed to explain the strange phenomena is a neutron of mass two, twice as heavy as the ordinary kind.

The reaction which may happen in the experiment is that two heavy hydrogen cores—the deutons—combine and then turn into two light hydrogen atoms and one neutron of mass two.

The existence of an over-weight neutron would also reconcile some of the differences of opinion about the exact weight of the ordinary neutron. Mixed up in this controversy is the possibility that there exists also a little, or light-weight neutron, called provisionally the neutrino. The neutrino, from the Italian, was suggested some years ago by Prof. E. Fermi, who recently discovered element No. 93. The English version of neutrino would be neutrette.

While the existence of the neutrino has not yet been proved, science has predicted some of its properties. A neutrino would be an electrically neutral particle like its big brother the neutron, but would weigh only about as much as an electron, that is, 1/1800 the mass of a hydrogen atom.

Physicists foresee that like most of the atomic particles the neutrino would spin on some axis (like the earth). But they predicted also that the spin might be either clockwise or counter-clockwise. The neutrino is spinning one way. Its twin, spinning in the reverse direction, has been given the name of anti-neutrino, although it too is yet unfound. The spin of the neutrino and the anti-neutrino would make it possible to account for some of the mysterious magnetic properties in atoms.

Science News Letter, July 14, 1934

NUTRITION

Average Man May Need More Than 3000 Calories

DOES the average man doing an average day's work need to get more or less than 3000 calories in his daily diet?

This is one of many questions in the field of nutrition which require further research, Prof. Lafayette B. Mendel of Yale University reported to the American Home Economics Association.

The 3000-calorie requirement, now almost universally accepted, is based on precise scientific calculation of energy requirement made during the World War, Prof. Mendel pointed out. It is now under discussion because of the declining need of energy foods in this day of labor-saving devices. In England at present some groups of scientists favor increasing the calorie requirement to 3400 with a reduction in the amount of protein foods.

"This gives an incentive for further investigation into what the real working status of the coming generation is to be," Prof. Mendel observed.

Another point requiring further research is the actual role of the vitamins in maintaining health. This is particularly important in relation to sub-acute disorders arising from partial rather than complete lack of certain essentials of diet. The malnutrition of certain types of alcoholism comes under this head.

The problem of storage depots in the body for reserve supplies of vitamins, water, fats, mineral nutrients and other substances needs investigation. The

conditions under which vitamin A is stored have already been examined and the results suggest that much of this vitamin may be destroyed in the digestive tract.

The value of roots, tubers, leaves and fruits is little understood. Fruitful field for research also lies in the direction of texture of foods, about which dentists are particularly concerned at present, and food allergy or sensitiveness.

Science News Letter, July 14, 1934

NUTRITION

New Knowledge of Foods May Favor the Farmer

FARMERS will be helped by the new knowledge scientists have gained about food values, vitamins and the like. This new factor in agricultural aid was discussed by Prof. H. C. Sherman of Columbia University before the American Home Economics Association.

The importance of milk, fruit and vegetables in the diet is the specific discovery in nutrition which will aid the farmer. Knowledge of the value of these foods is gradually reaching the people and already is causing shifts in consumer demand among the different types of food.

"The net effect of these shifts is to favor the farm by furnishing a market for the product of a fuller and more up-to-date use of its acres and of the farmer's time and effort," Prof. Sherman stated.

"Such an evolution, wholesome alike from the standpoint of food production and food consumption, of agriculture and of consumer nutrition and health, we should not allow to be unduly retarded by the prejudice of general custom or the bias of any special group," he added.

"There is sound health reason for and no sound economic reason against the growing prominence of the protective foods in the general food supply."

The protective foods to which Prof. Sherman referred are milk, fruit, vegetables and eggs. They are called protective because their rich supply of vitamins and minerals will, if eaten in sufficient amounts, protect the consumer against the greatest dangers of dietary deficiency. Prominence of these foods in the diet also helps the body to protect itself against several kinds of infections, Prof. Sherman pointed out. He gave the following specific advice on diet:

"I think it is well to provide at least half of the needed calories in the form of the protective foods; and also that at least half of the breadstuffs and cereals used be in the 'whole grain' or 'dark' or 'unskimmed' forms. These two simple suggestions take account of all known nutritional needs."

The place of eggs in the diet and the question of how much of the protective foods are needed to get the full benefit which they are capable of yielding are two points on which further research is needed, Prof. Sherman said. His two-point dietary advice is based on present knowledge of this last question.

Science News Letter, July 14, 1934

LANGUAGE

Science Takes Measure Of Roosevelt Vocabulary

WHEN President Roosevelt comes before the microphone to talk to the people about the affairs of the United States, he uses a vocabulary almost as simple as that of the famous Lincoln Gettysburg address.

This is the report of Dr. Richard S. Schultz of the Psychological Corporation in New York City, announced in the educational journal, *School and Society*.

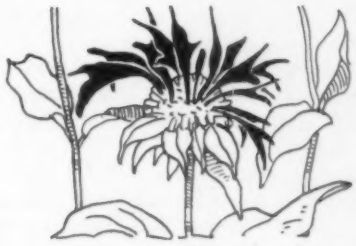
Dr. Schultz was led to make a statistical study of President Roosevelt's radio vocabulary because choice of language is vitally important to any speaker who would mould public opinion.

Comparing President Roosevelt's inaugural address and a radio message on national conditions given October 23, 1933, with lists of the most common words in the language, Dr. Schultz found that 70 per cent. of the words used on these two occasions occur among the 500 most common words found in general reading material. President Lincoln spoke even more simply at Gettysburg. Over 77 per cent. of his words are among the 500 most common words.

Science News Letter, July 14, 1934

BOTANY

NATURE RAMBLINGS by Frank Thone



Monarda

NOW is the year's high tide for the genus *Monarda*, a most interesting group of plants belonging to the mint family. Various species are popularly known as Oswego Tea, Horsemint, Wild Bergamot, and by other names. They are interesting and attractive plants, the commonest species with tousled blue heads of flowers, making a ragged but bright hedge beside the road, and straggling through open, sun-streaked woodland reaches.

The whole brotherhood is recognizable as of the mint tribe at a glance. They have the square stem that marks the mints, and their long-throated flowers divide yawningly at the top into the two-lipped irregular corolla that has given the mint family the general name of Labiateae. And if any doubt were left, one only needs to crush the leaves and smell them. The odor is not that of mint; it is stronger, and to most nostrils ranker, but its kinship is indubitable.

During the World War one species of this genus came in for a brief commercial exploitation. It contains the valuable drug thymol, but not enough of it to make extraction pay at usual prices. However, when the German supply was cut off the price went up, and several small establishments came into being for the duration of the war.

Although the color affected by most of the species is blue, one Monarda, from Texas, has crashed into our gardens with a bright red note. It is hard to find a place where this plant will harmonize with anything but white flowers, because it is one of the most impossible reds imaginable: a vivid, hot, screaming cerise. Nevertheless, the plant is much cultivated.

Science News Letter, July 14, 1934

First Glances at New Books

Biology

THE ANCESTRY OF THE LONG-LIVED—Raymond Pearl and Ruth DeWitt Pearl—*Johns Hopkins Press,* 168 p., $3. The book is a careful statistical study of the factors bearing upon longevity or extreme longevity, that is to say, those cases in which life has continued for 90 years or more. The results are presented in the technical phraseology of the statistician and only the trained worker in this science will be able to follow critically the evidence and arguments set down, but anyone with biological training may gather an intelligent conception of the methods used and of the conclusions reached by the authors. Briefly stated, they find that there is no doubt of the existence of an hereditary factor in cases of extreme long life, but the evidence is not sufficient to indicate that transmission of this characteristic takes place in accordance with Mendelian formulas. In fact the authors seem to lean rather to the view that longevity is one of those deeper attributes of the organism which are bound up with the biological constitution of the individual and whose mechanism of transmission is still unknown.

Science News Letter, July 14, 1934

Mathematics

ESSENTIALS OF PLANE TRIGONOMETRY AND ANALYTICAL GEOMETRY—Atherton H. Sprague—*Prentice-Hall,* 228 p., $1.80. This is a textbook which packs into one volume the "meat" of that initial bugaboo of college-freshman math. The author, associate professor of mathematics at Amherst College, in his treatment of the material, aims at an adequate preparation for calculus. The book divides itself readily into two sections, one on each of its subjects. Copious doses of problems at the end of each chapter and the precalculus motive adapt it for engineering schools.

Science News Letter, July 14, 1934

Mathematics

ESSENTIALS OF PLANE TRIGONOMETRY—Atherton H. Sprague—*Prentice-Hall,* 119 p., 80c. Reprint of the first 119 pages of the previous textbook bound in heavy paper. Same clear, pleasing make-up and typography.

Science News Letter, July 14, 1934

Zoology

VANISHING WILDERNESS—F. R. LaMonte and M. H. Welch—*Liveright,* 340 p., $2.50. Facing, sadly but frankly, the fact that the Veldt is disappearing just as the Plains disappeared, so far as game herds are concerned, these two American Museum workers undertake to make some of the more interesting of the still-surviving animal species live on between the covers of their book. They succeed, too, because they have a vivid and vital literary style, and have judiciously interspersed their pages with good line and color illustrations. Simply written but not "written down," the book makes an ideal one to place in the hands of children.

Science News Letter, July 14, 1934

Zoology

SCULPTURES BY HERBERT HASELTINE OF CHAMPION DOMESTIC ANIMALS OF GREAT BRITAIN—*Field Museum of Natural History,* 45 p., 25c. A number of really inspired portrait statues of noted prize winning domestic animals of Great Britain were recently acquired by the Field Museum. In this pamphlet they are described and excellently illustrated.

Science News Letter, July 14, 1934

General Science

PROCEEDINGS OF THE INDIANA ACADEMY OF SCIENCE, VOL. 43—Stanley A. Cain, Editor—*Available from State Librarian, Indianapolis,* 226 p., $3. A publication containing scientific papers presented at meeting of the Academy held at Indiana University, October, 1933.

Science News Letter, July 14, 1934

Physics

EXPOSÉS DE PHYSIQUE ATOMIQUE EXPÉRIMENTALE: Pt. II, LES PREUVES EXPÉRIMENTALES DE LA MÉCANIQUE ONDULATOIRE—Jean-J. Trillat, 36 p., 12 fr.; Pt. III, RAYONS COSMIQUES—M. Maurice de Broglie, 48 p., 15 fr.—*Hermann et Cie., Paris.* Part III contains a bibliography of 105 items, on cosmic rays.

Science News Letter, July 14, 1934

Marine Zoology

NEW MOLLUSKS OF THE FAMILY TURRITIDAE—Paul Bartsch—*Smithsonian Inst.,* 29 p., 8 pl. 15c.

Science News Letter, July 14, 1934

Psychology

CIVILIZED LIFE—Knight Dunlap—*Williams and Wilkins,* 374 p., $4. A revision and enlargement of the author's previous work on Social Psychology. New chapters are included on "Desire," "Race and Civilization," and "The Child as a Member of the Group." Instincts are not fundamental data of psychology, Dr. Dunlap holds, and he adds: "It is true, that when we discard instincts, we find that we have to deal with desires, which seem at first to be the instincts under new names . . . but desires are actual data of psychology, not arbitrary classifications." These desires he classifies tentatively under nine headings as follows: 1. Alimentary desire. The desire for food and drink. 2. Excretory desire. Riddance. The desire to be rid of annoying or inconvenient materials or processes. 3. Protection desire. Desire for shelter from adverse external forces. 4. Activity desire. The desire for motor performance and occupation. 5. Desire for rest and relaxation. 6. Amorous or erotic desire. Desire for stimulation by, and association with, an individual of the opposite sex. 7. Parental or philopedic desire. Desire for the possession of children. 8. Desire of preeminence. Desire to be a leader, or a focus of attention and interest. 9. Desire of conformity. Desire to belong to a group, and to participate in the group characteristics.

Science News Letter, July 14, 1934

Sociology

SOCIAL CHANGE AND THE NEW DEAL (SOCIAL CHANGES IN 1933)—Edited by William F. Ogburn—*University of Chicago Press,* 120 p., $1. A symposium containing such provocative essays as: Economic Recovery, Unemployment and Relief, Agriculture and Rural Life, The Tennessee Basin, The Future of the New Deal.

Science News Letter, July 14, 1934

Geology

BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY, 1931 AND 1932—John M. Nickles—*Government Printing Office,* 300 p., 25c.

Science News Letter, July 14, 1934

Science News Letter will secure for its subscribers any book or magazine in print which was published in the United States. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted) and we will pay postage in the U. S. When publications are free, send 10c. for handling. Address Book Dept., Science News Letter, 21st and Constitution Ave., Washington, D. C.